In the above described arrangements, a greater degree of scrambling may be obtained by transmitting signals representative of the conjugate, or inverse, of the amplitude envelope, rather than of the actual envelope. This has the additional advantage that it becomes much more difficult, if not impossible, to determine when speech is being transmitted, which would otherwise be indicated by bursts of "noise." Furthermore, there is a signal continuously available for synchronising transmitter and receiver sequence generators.

Although the embodiments above described refer only to two-level or binary signals (when not referring to analogue signals), other numbers of levels in the multi-level signals may be employed; for example three and four level signals may be employed. In these cases, subtraction circuits are required at the receivers in place of the modulo-two adders. (Conversely, subtraction of the pseudo-random sequences may be performed at the transmitters with corresponding addition at the receivers).

Signals other than speech signals may be transmitted as above described, and transmission may be by means other than wireless transmission, for example, by line transmission, as in a telephone system.

Other modifications and variations are possible within the scope of the invention.

I claim:

1. Receiver terminal apparatus for receiving an input signal containing intelligence and delivering as an output signal the intelligence contained in the input signal, the input signal comprising superimposed first and second components, said first component being the scalar combination of a first digital signal having a plurality of possible amplitude levels which occur in a pseudo-random sequence and a second digital signal having a plurality of possible amplitude levels wherein amplitude level transitions represent amplitude datum level transitions in an analogue signal containing said intelligence, said second component representing the amplitude envelope of said analogue signal containing said intelligence, said receiver terminal apparatus comprising

a. first signal generator means to generate a first replica signal which is a replica of said first digital signal,

b. second signal generator means responsive to said input signal to generate a second digital signal which has a plurality of possible amplitude levels and in which transitions between said amplitude levels represent traversals of at least one amplitude datum level by said input signal,

c. first signal combining means to combine said first replica signal with said second digital signal to derive a second replica signal representing said amplitude datum level transitions in said analogue signal,

d. signal processing means to recover a third replica signal which is a replica of said amplitude envelope, and

e. second signal combining means to combine said third replica signal with said second replica signal to form said output signal.

2. Apparatus according to claim **1** in which said signal processing means comprises amplitude envelope detector means coupled to receive said input signal and coupled to said second signal combining means in signal bypass relationship both to said second signal generator means and to said first signal combining means.

3. Apparatus according to claim **1** in which said signal processing means comprises third signal generator means to generate a third digital signal which has a plurality of possible amplitude levels which occur in pseudo-random sequence, third signal combining means to combine said third digital signal with said second digital signal to form a fourth digital signal, and amplitude envelope derivation means coupled to receive said fourth digital signal and to produce said third replica signal therefrom.

4. A speech descrambler comprising

a. means to receive a scrambled speech signal,

b. signal squaring means to square the received scrambled speech signal,

c. a pseudo-random sequence generator,

d. first signal combining means to combine the output of the squaring means with the output of the pseudo-random sequence generator,

e. a further pseudo-random sequence generator,

f. second signal combining means to combine the output of the first signal combining means with the output of the further pseudo-random sequence generator,

g. amplitude envelope derivation means to derive the amplitude envelope from the output of said second signal combining means,

h. third signal combining means to combine the output of said first signal combining means with the output of said amplitude envelope derivation means to produce a descrambled speech signal, and

i. audio transducer means to convert said descrambled speech signal to audible descrambled speech.

5. A speech descrambler according to claim **4** in which said amplitude envelope derivation means comprises series-connected low-pass filter means and non-linear circuit means.

6. A speech descrambler according to claim **4** further including high-frequency de-emphasizing means coupled between said third signal combining means and said transducer means.

7. A speech descrambler according to claim **6** in which said high-frequency de-emphasizing means comprises signal integrator means.

8. A speech descrambler according to claim **4,** further including noise and spurious high-frequency signal component suppression means coupled between said third signal combining means and said transducer means.

9. A speech descrambler according to claim **8,** in which said suppression means is a low-pass filter.

10. A communication system for transmitting the intelligence of an intelligence containing signal having components of variable frequency and variable amplitude, said intelligence containing signal frequently traversing at least one amplitude datum level including zero amplitude, said intelligence containing signal having an amplitude envelope, said system comprising:

i. a transmitter terminal;

ii. a receiver terminal; and

iii. a communication path between said transmitter and receiver terminals;

iv. said transmitter terminal comprising: